Claims:

1. An hydrolytically stable isoelectric hydrogel material comprising a single isoelectric compound having a defined pI value from 1 to 12 being incorporated into a hydrogel formed by reacting an oligo- or polyhydroxy compound with the single isoelectric compound and a difunctional or oligofunctional crosslinker, wherein after incorporation of the sinlge isoelectric compound into the hydrogel, the hydrogel material becomes an ampholytic material.

2. The hydrogel material according to claim 1 having a pI value which does not substantially change when the extent of incorporation of the isoelectric compound is altered, as long as the concentration of the single isoelectric compound in the hydrogel is higher than what is required to establish a pH in the hydrogel substantially equal to the pI value of the single isoelectric compound.

3. The hydrogel material according to claim 1 or 2 wherein the single isoelectric compound for preparing acidic isoelectric hydrogels is selected from the group consisting of iminodicarboxylic acids, alkyliminodicarboxylic acids, aryliminodicarboxylic acids, iminooligocarboxylic acids, aminodicarboxylic acids, alkylaminodicarboxylic acids, arylaminodicarboxylic acids, alkylarylaminodicarboxylic acids, aminooligocarboxylic acids, alkylaminooligocarboxylic acids, arylaminooligocarboxylic acids, alkylarylaminooligocarboxylic acids, oligoaminooligocarboxylic acids, iminodiphosphonic acids, alkyliminodiphosphonic acids, aryliminodiphosphonic acids, iminooligophosphonic acids, aminophosphonic acids, alkylaminophosphonic acids, arylaminophosphonic acids, alkylarylaminophosphonic acids, aminodiphosphonic acids, alkylaminodiphosphonic acids, arylaminodiphosphonic acids, alkylarylaminodiphosphonic acids, aminooligophosphonic acids, alkylaminooligophosphonic acids, arylaminooligophosphonic acids, alkylarylaminooligophosphonic acids, oligoaminooligophosphonic acids, aminophenols, aminodiphenols, amino oligophenols, oligoamino oligophenols, iminodiphenols, and compounds containing combinations of the functional groups thereof.

4. The hydrogel material according to claim 3 wherein the single isoelectric compound is selected from the group consisting of iminodiacetic acid with a pI value of pI < 2.5, aspartic acid with a pI value of pI < 3, and glutamic acid with a pI value of pI < 4.

5. The hydrogel material according to claim 1 or 2 wherein the single isoelectric compound for preparing basic isoelectric hydrogels is selected from the group consisting of diaminocarboxylic acids, diaminophenols, diaminophosphonic acids, oligoaminocarboxylic acids, oligoaminophenols, oligoaminophosphonic, and compounds containing combinations of the functional groups thereof.

6. The hydrogel material according to any one of claims 1 to 5 wherein the single isoelectric compound is incorporated into the hydrogel by reacting the compound and one or more of the hydrogel constituents with a difunctional or oligofunctional agent, wherein the agent assists in incorporation of the isoelectric compound into the isoelectric hydrogel via a nitrogen atom (amine group) or an hydroxy group present in the compound.

7. The hydrogel material according to claim 6 wherein the difunctional or oligofunctional agent is selected from the group consisting of diepoxides, dihalides, and epihalohydrines.

8. An hydrolytically stable isoelectric hydrogel material comprising an isoelectric compound having a defined pI from 1 to 12 being incorporated into and/or grafted onto a suitable oligomeric or polymeric scaffold that can be subsequently turned into an hydrogel and/or a membrane, wherein after incorporation of the isoelectric compound the hydrogel material becomes an ampholytic material.

9. The hydrogel material according to claim 8 having a pI value which does not substantially change when the extent of incorporation of the isoelectric compound is altered, as long as the concentration of the single isoelectric compound in the hydrogel is higher than what is required to establish a pH in the hydrogel substantially equal to the pI value of the single isoelectric compound..

10. The hydrogel material according to claim 8 or 9 wherein the single isoelectric compound for preparing acidic isoelectric hydrogels is selected from the group consisting of iminodicarboxylic acids, alkyliminodicarboxylic acids, aryliminodicarboxylic acids, iminooligocarboxylic acids, aminodicarboxylic acids, alkylaminodicarboxylic acids, arylaminodicarboxylic acids, alkylarylaminodicarboxylic acids, aminooligocarboxylic acids, alkylaminooligocarboxylic acids, arylaminooligocarboxylic acids, alkylarylaminooligocarboxylic acids, oligoaminooligocarboxylic acids, iminodiphosphonic acids, alkyliminodiphosphonic acids, aryliminodiphosphonic acids, iminooligophosphonic acids, aminophosphonic acids, alkylaminophosphonic acids, arylaminophosphonic acids, alkylarylaminophosphonic acids, aminodiphosphonic acids, alkylaminodiphosphonic acids, arylaminodiphosphonic acids, alkylarylaminodiphosphonic acids, aminooligophosphonic acids, alkylaminooligophosphonic acids, arylaminooligophosphonic acids, alkylarylaminooligophosphonic acids, oligoaminooligophosphonic acids, aminophenols, aminodiphenols, amino oligophenols, oligoamino oligophenols, iminodiphenols, and compounds containing combinations of the functional groups thereof.

11. The hydrogel material according to claim 10 wherein the single isoelectric compound is selected from the group consisting of iminodiacetic acid with a pI value of $pI < 2.5$, aspartic acid with a pI value of $pI < 3$, and glutamic acid with a pI value of $pI < 4$.

12. The hydrogel material according to claim 8 or 9 wherein the isoelectric compound for preparing basic isoelectric hydrogels is selected from the group consisting of diaminocarboxylic acids, diaminophenols, diaminophosphonic acids, oligoaminocarboxylic acids, oligoaminophenols, oligoaminophosphonic, and compounds containing combinations of the functional groups thereof.

13. The hydrogel material according to any one of claims 8 to 12 wherein the oligomeric or polymeric scaffold is selected from the group consisting of unhydrolyzed or partially hydrolyzed poly(epihalohydrine)s, poly(vinyl alcohol)s and their derivatives, unhydrolyzed or partially hydrolyzed poly(vinyl acetate)s and their derivatives,

hydrolyzed or partially hydrolyzed poly(vinyl chloride)s, oligo- and polysaccharides and their derivatives.

14. The hydrogel material according to claim 8 formed by reacting iminodiacetic acid, poly(vinyl alcohol) and glycerol diglycidyl ether in the presence of NaOH.

15. The hydrogel material according to claim 8 formed by reacting aspartic acid, poly(vinyl alcohol) and glycerol diglycidyl ether in the presence of NaOH.

16. The hydrogel material according to claim 8 formed by reacting glutamic acid, poly(vinyl alcohol) and glycerol diglycidyl ether in the presence of NaOH.

17. The hydrogel material according to claim 8 formed by reacting iminodiacetic acid, poly(vinyl alcohol) and poly(ethylene glycol) diglycidyl ether in the presence of NaOH.

18. The hydrogel material according to claim 8 formed by reacting aspartic acid, poly(vinyl alcohol) and poly(ethylene glycol) diglycidyl ether in the presence of NaOH.

19. The hydrogel material according to claim 8 formed by reacting glutamic acid, poly(vinyl alcohol) and poly(ethylene glycol) diglycidyl ether in the presence of NaOH.

20. The hydrogel material according to claim 8 formed by reacting lysine, poly(vinyl alcohol) and glycerol diglycidyl ether in the presence of NaOH.

21. A hydrolytically stable hydrogel membrane comprising an isoelectric material according to any one of claims 1 to 20 supported on an inert or crosslinkable or crosslinked substrate.

22. The hydrogel membrane according to claim 21 wherein the substrate is selected from the group consisting of materials made of poly(vinyl alcohol) and its derivatives, partially or fully hydrolysed poly(vinyl acetate) and its derivatives, partially or fully hydrolysed poly(epihalohydrine) and its derivatives, partially or fully hydrolysed poly(epihalohyrine-co-polyethylene oxide) and its derivatives, poly(vinyl chloride) and its derivatives, polyvinylsulfone and its derivatives, and polyether ether ketone and its derivatives.

23. A method for forming an hydrolytically stable isoelectric hydrogel material comprising:

reacting a single isoelectric compound having a defined pI of 1 to 12 with an oligo- or polyhydroxy compound and a difunctional or oligofunctional agent, wherein after incorporation of the single isoelectric compound into the hydrogel, the hydrogel material becomes an ampholytic material.

24. A method for forming an hydrolytically stable isoelectric hydrogel material comprising:

incorporating or grafting a single isoelectric compound having a defined pI of 1 to 12 onto an oligomeric or polymeric scaffold that can be subsequently turned into hydrogel and/or membrane, wherein after incorporation or grafting of the single isoelectric compound, the hydrogel material becomes an ampholytic material.

25. A method for forming an hydrolytically stable hydrogel membrane comprising:

carrying out the method according to claim 23 or 24; and

applying the isoelectric material onto an inert or crosslinkable or crosslinked supporting substrate to form a hydrolytically stable hydrogel membrane.

26. An isoelectric hydrogel material produced by the method according to claim 23 or 24.

27. Use of hydrolytically stable hydrogel membrane according to any one of claims 1 to 20 in the separation of compounds by electrophoresis.